



# Advantages of a Layered Architecture for Enterprise Data Warehouse Systems

Thorsten Winsemann, Veit Köppen, Gunter Saake  
Otto-von-Guericke-Universität, Magdeburg/Germany



OTTO VON GUERICKE  
UNIVERSITÄT  
MAGDEBURG

INF

FAKULTÄT FÜR  
INFORMATIK



# Table of contents

- 1. Characteristics of Enterprise Data Warehouses**
- 2. Traditional Data Warehouse Architecture**
  1. Reference Architecture
  2. Dataflow-Example
- 3. Architectures for Enterprise Data Warehouses**
  1. SAP's Layered, Scalable Architecture
  2. Layers in Detail
  3. Dataflow-Example
  4. Simple, but Detailed Example
- 4. Architectural Differences**
  1. Overview
  2. Advantages of a Layered Architecture





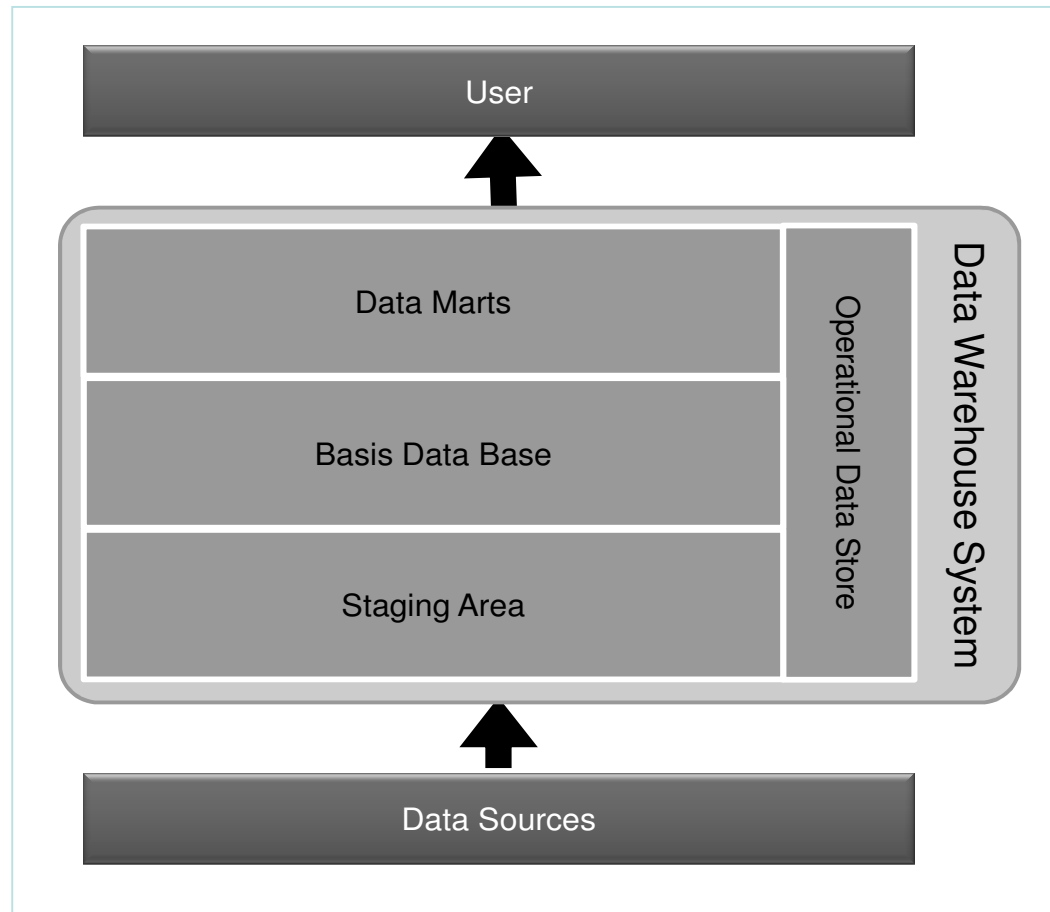
## Characteristics of Enterprise Data Warehouses (EDW)

- Business DW, thus covering all business areas
- Data basis for several applications, such as BI, planning, CRM, ...
- Single Version of Truth of company's data
- Multiple, heterogeneous source systems
- Huge amount of data (granular, detailed, old)
- World-wide scope, different time zones
- 24\*7-hours availability
- ...

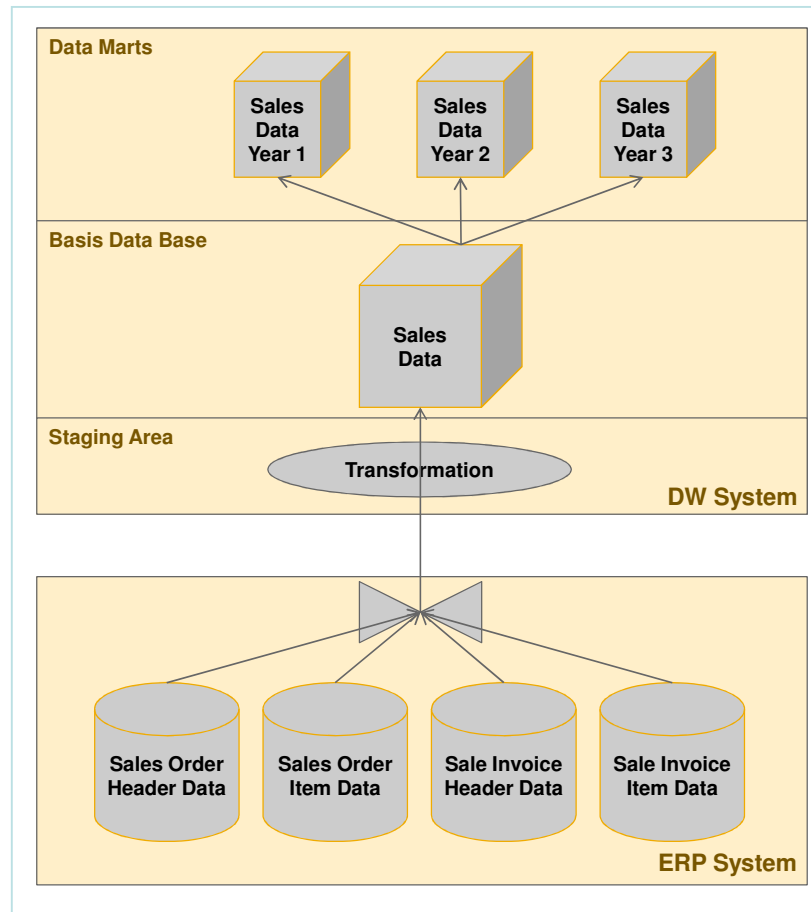




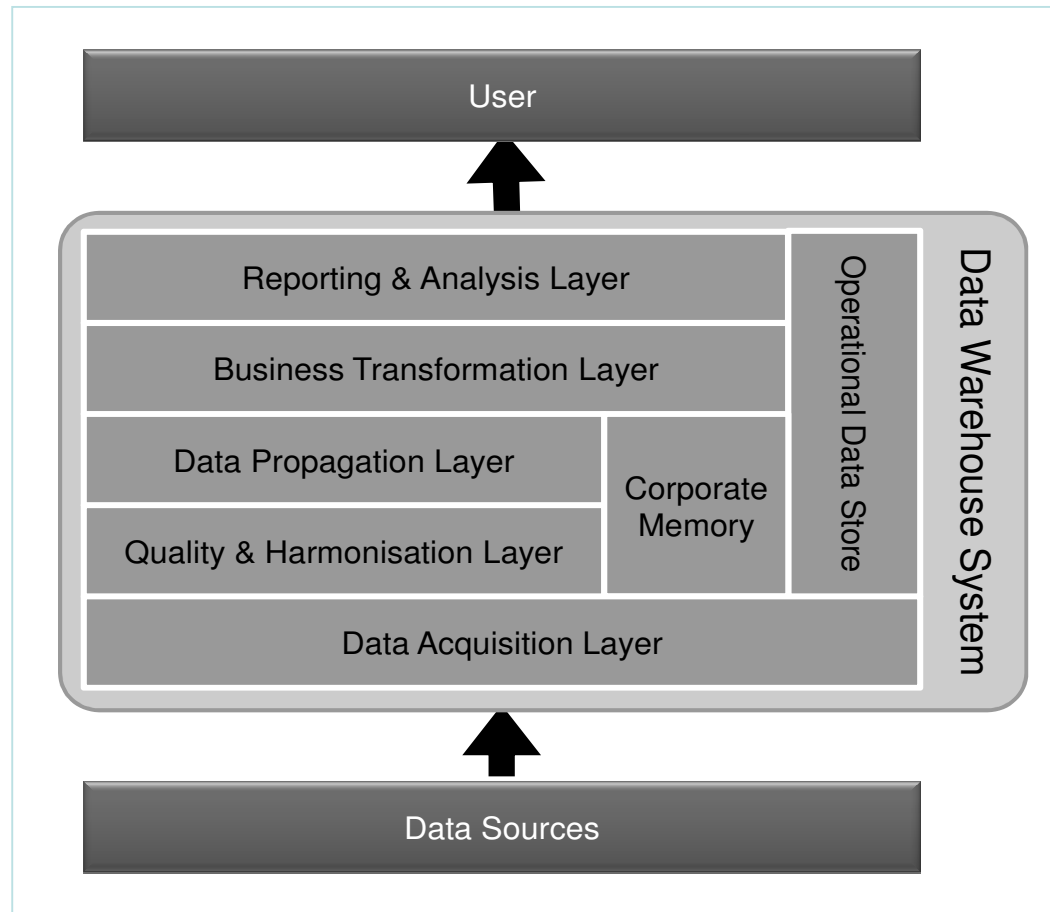
## Traditional Data Warehouse Architecture: Reference Architecture



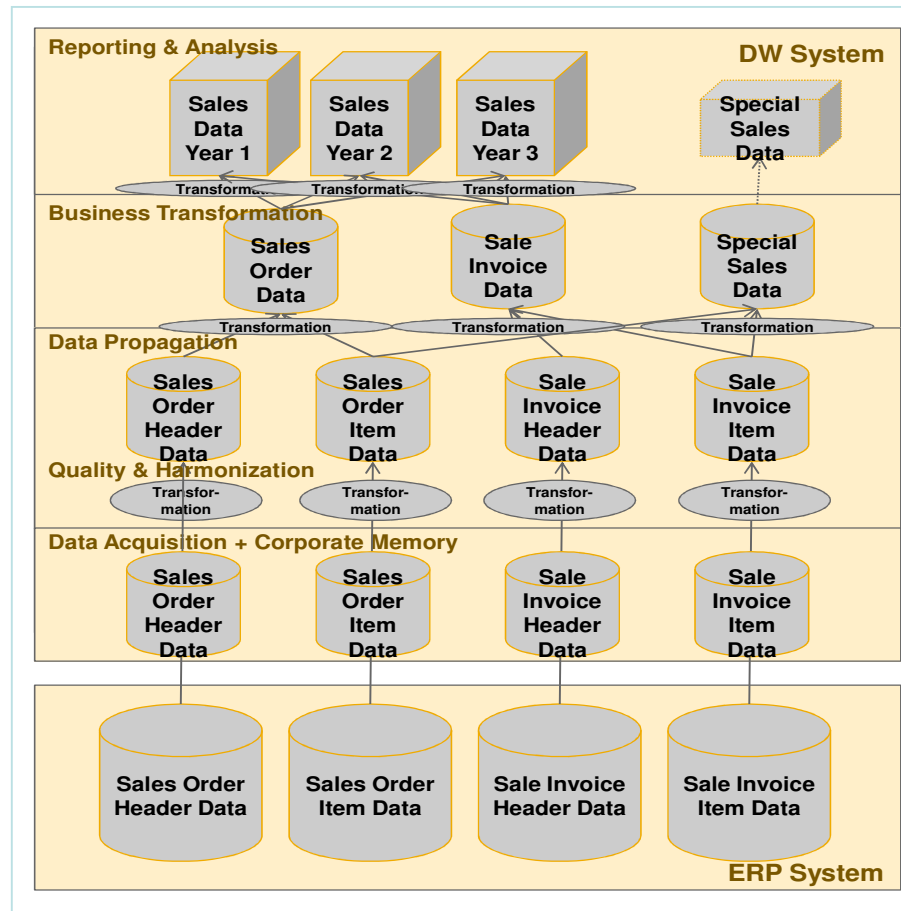
# Traditional Data Warehouse Architecture: Dataflow-Example



# Architecture for Enterprise Data Warehouses: SAP's Layered, Scalable Architecture



# Architecture for Enterprise Data Warehouses: Dataflow-Example





# Architecture for Enterprise Data Warehouses: Layers in Detail (1)

- Data Acquisition Layer
  - „DW Inbox“ (temporary)
  - Data stored immediately without changes
- Corporate Memory
  - „DW Life Insurance“ (long-term, granular, complete)
  - Data for non-predictable demands („master the unknown“)
- Quality & Harmonization Layer
  - Technical and semantical data integration
  - Usually no data storage





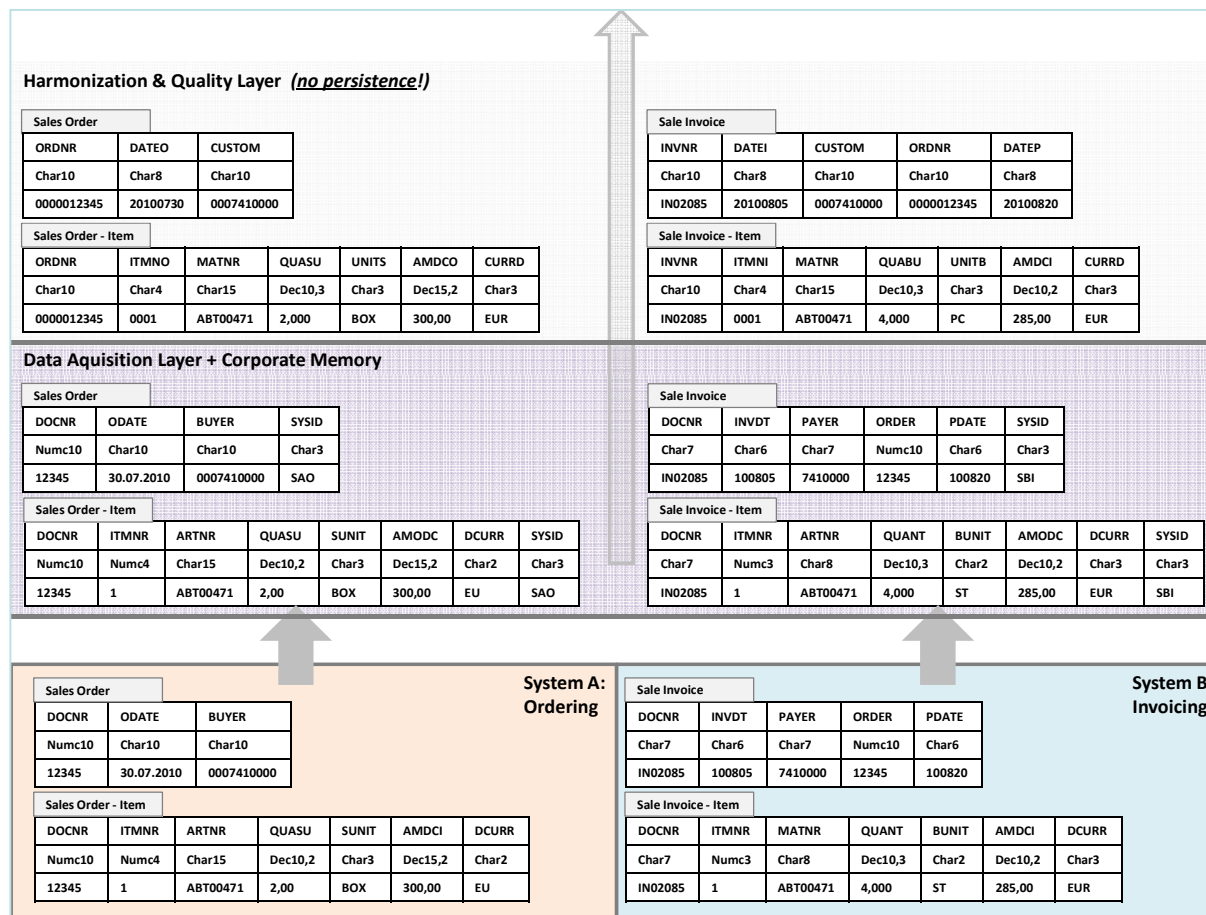


## Architecture for Enterprise Data Warehouses: Layers in Detail (2)

- Data Propagation Layer
  - „Single Version of Truth“
  - Harmonized, integrated data without business logic
- Business Transformation Layer
  - Data are transformed according to business' needs
  - E.g., combination of sales + finance figures
- Reporting & Analysis Layer
  - Data are transformed according to requirements for usage and fast access performance



# Architectures for Enterprise Data Warehouses: Simple, but Detailed Example (1)

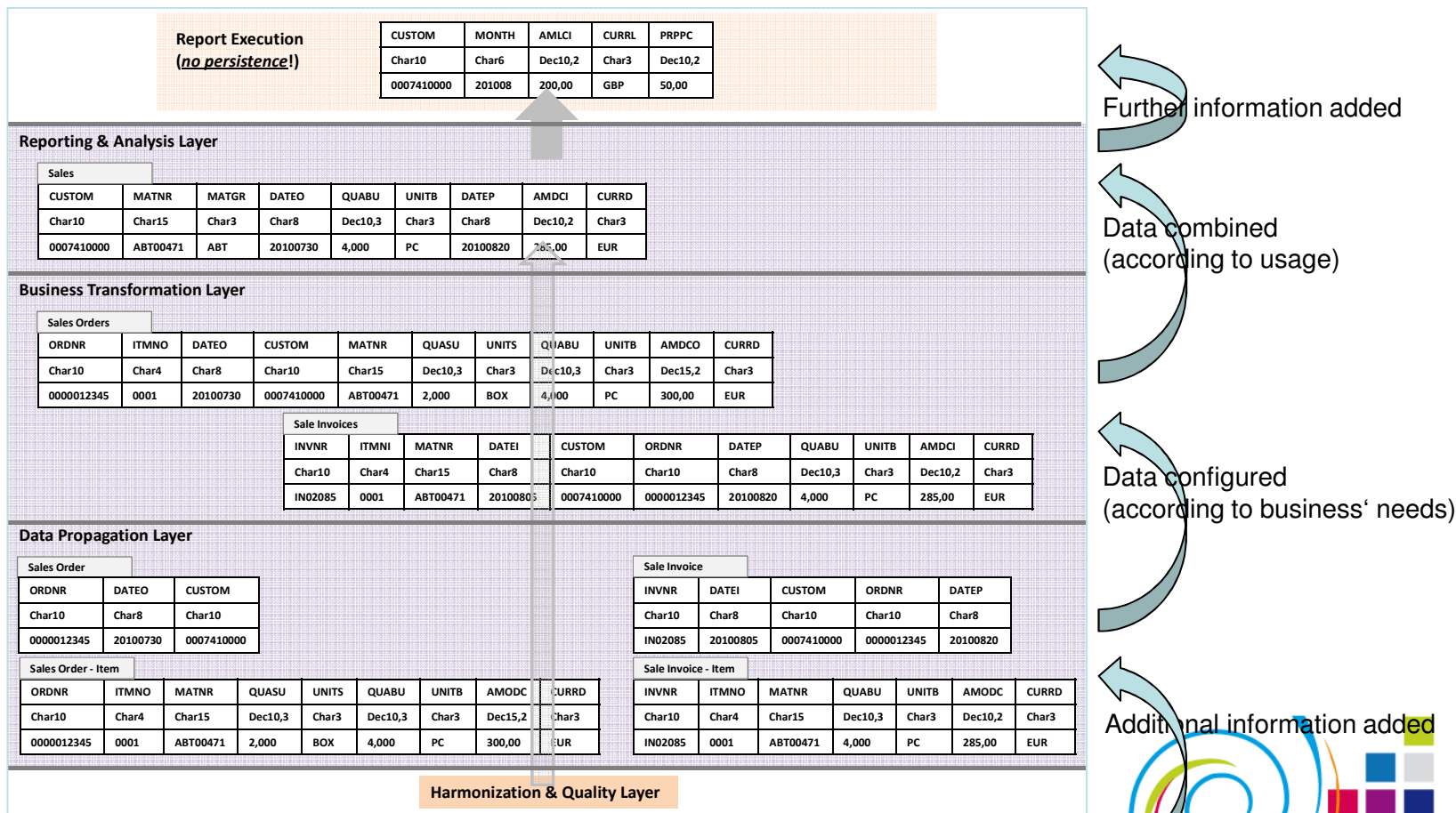


Data types adapted  
Homonyms split  
Synonyms merged  
Field names changed

System-ID added



# Architectures for Enterprise Data Warehouses: Simple, but Detailed Example (2)





# Architectural Differences: Overview

Matter	Reference Architecture	Layered Architecture
Complexity	Medium	High (several layers)
Data volume	High	Very high
Conceptual work	Medium (requirement-driven)	High (overall concept view)
Implementation effort	Medium	High
Enhancement & scalability	Possible	Supported





## Architectural Differences: Advantages of a Layered Architecture

Matter	Reference Architecture	Layered Architecture
Change of transformation rules (e.g., changed key-figure calculation)	Reload/-build from source system	Rebuild from propagation layer
Change of data (e.g., new key-figure calculation)	Reload/-build from source system	Rebuild from propagation layer
Need for new data	Dataflow enhancement and reload/-build	Load from propagation layer or corporate memory
„Single Version of Truth“	No	Yes
Decoupling of data load and availability	No/limited	Yes/supported
Detailed previous data	Limited	Available (corporate memory)





# Appendix

## CSDM 2011 Poster Layout

Slides' Arrangement  
on Panel

Panel: 150x125cm  
Slides: A3 + A4

